

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-321771

(43)Date of publication of application : 24.11.2000

(51)Int.Cl.

G03F 7/039
 C08F220/04
 C08F220/18
 C08F220/28
 C08K 5/00
 C08L 33/02
 C08L 33/04
 G03F 7/004
 H01L 21/027

(21)Application number : 11-127296

(71)Applicant : FUJI PHOTO FILM CO LTD

(22)Date of filing : 07.05.1999

(72)Inventor : SATO KENICHIRO
 KODAMA KUNIHICO
 AOSO TOSHIKI

(54) POSITIVE TYPE RESIST COMPOSITION

(57)Abstract:

PROBLEM TO BE SOLVED: To make it possible to prevent the occurrence of development defects and to obtain excellent resist pattern profiles and the definition of contact holes by incorporating a resin which contains specific repeating units and is increased in a dissolution rate in an alkaline developer by the effect of an acid and a compound which generates the acid by irradiation with active rays or radiation into the above composition.

SOLUTION: This composition contains a resin which contains one kind of the repeating units of formula I and formula II, the repeating units of formula III, formula IV, etc., and is increased in a dissolution rate in the alkaline developer by the effect of the acid a compd. which generates the acid by irradiation with active rays or radiation. In the formulas I to IV, R1 denote hydrogen atoms or methyl groups; R2 denotes 1-4C alkyl group; R3, R4 denote hydrogen atoms, etc.; R5 to R12 denote hydrogen atoms or (substituted) alkyl groups; R denotes a hydrogen atom, etc.; (m) denotes an integer from 1 to 10; X denotes a single bond or bivalent groups, such as (substituted) alkylene group and cyclic alkylene group, which are alone or are combined and are not decomposed by the effect of the acid.



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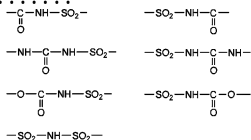
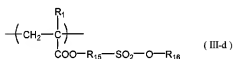
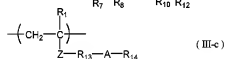
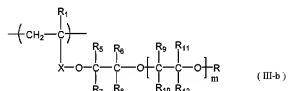
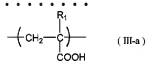
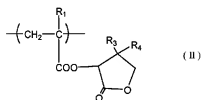
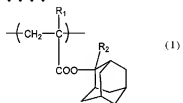
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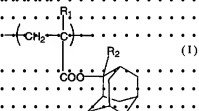
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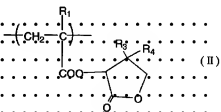
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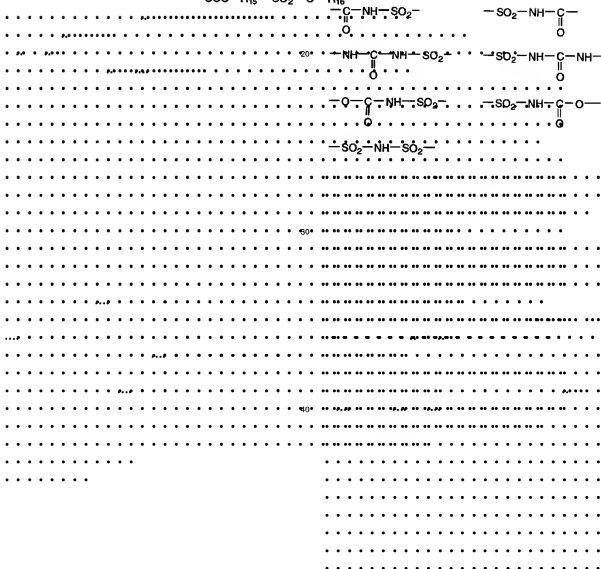
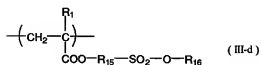
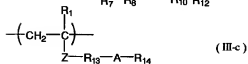
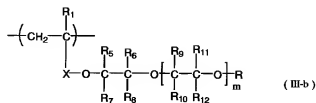
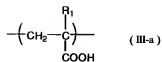
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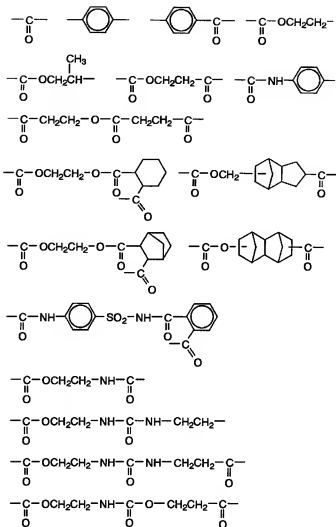




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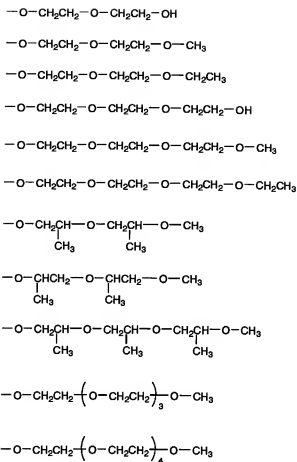
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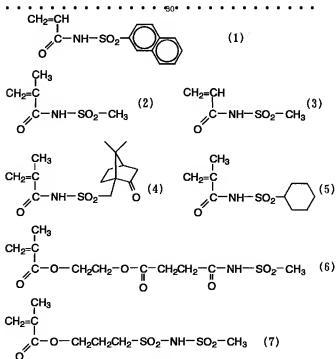
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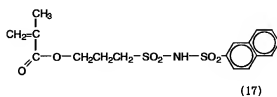
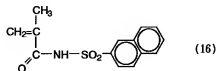
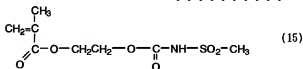
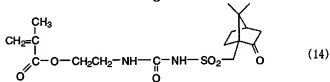
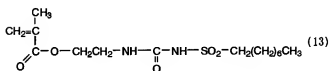
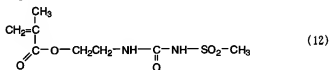
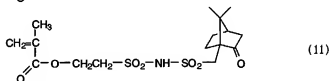
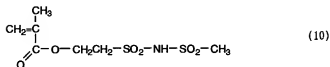
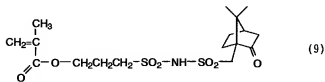
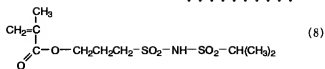


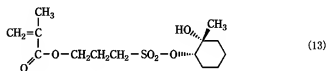
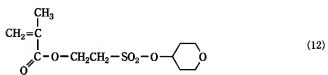
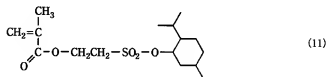
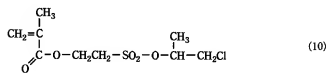
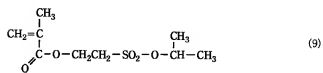
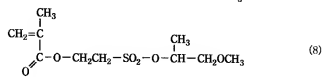
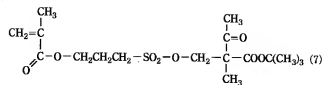
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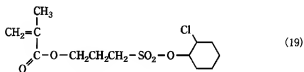
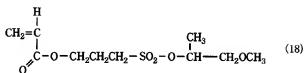
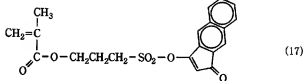
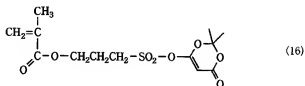
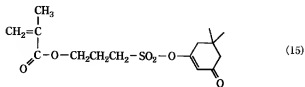
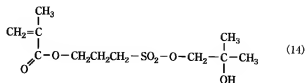
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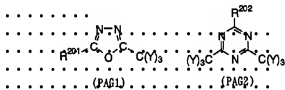




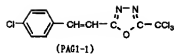




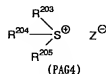
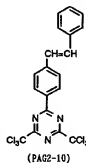
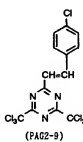
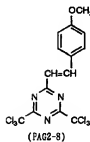
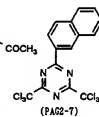
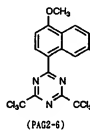
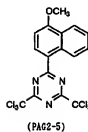
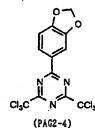
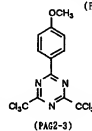
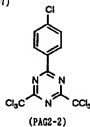
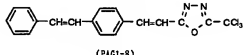
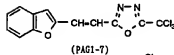
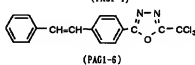
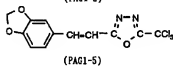
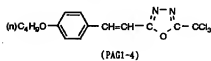
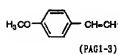
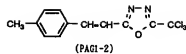
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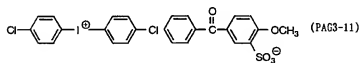
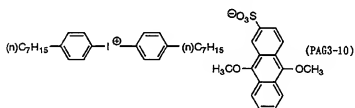
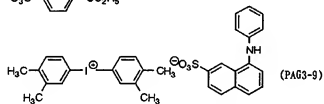
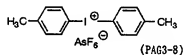
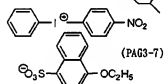
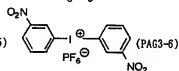
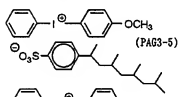
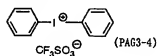
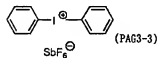
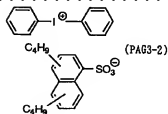
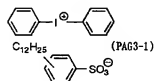


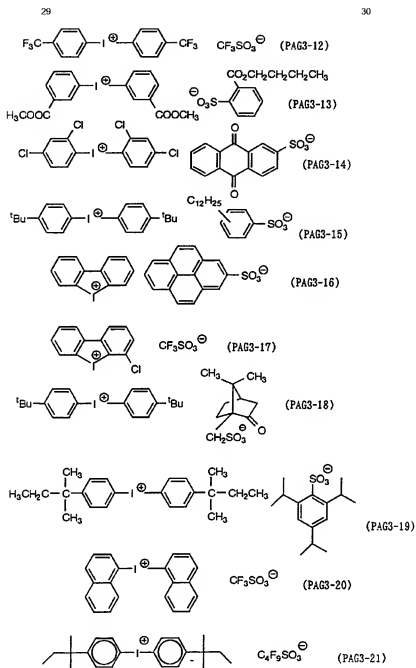
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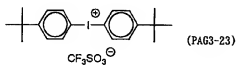
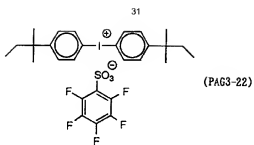


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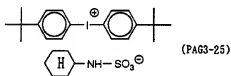
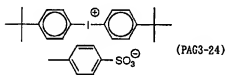
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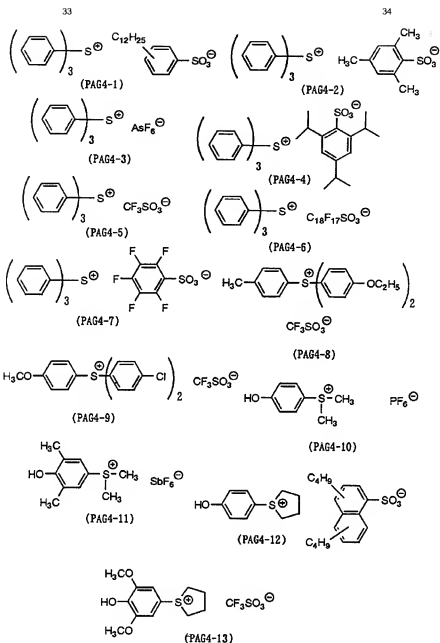


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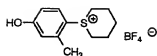
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50

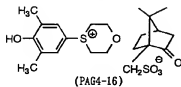




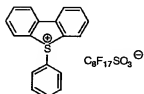
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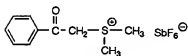
(PA64-15)



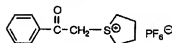
(PA64-16)



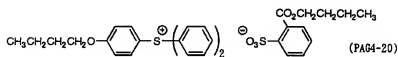
(PA64-17)



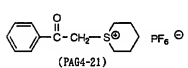
(PA64-18)



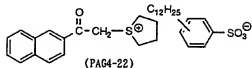
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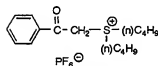
(PA64-20)



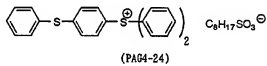
(PA64-21)



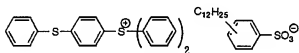
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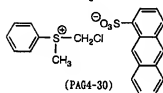
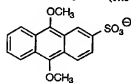
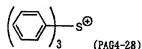
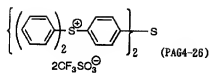
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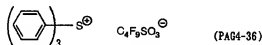
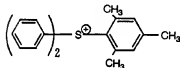
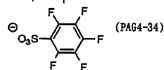
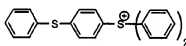
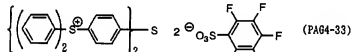
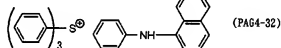
(PA64-24)



(PA64-25)

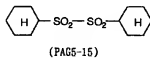
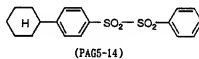
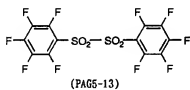
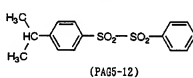
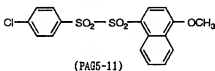
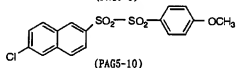
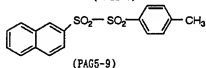
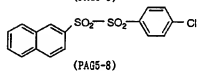
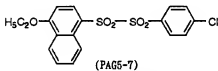
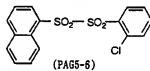
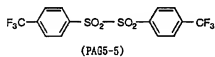
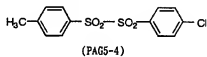
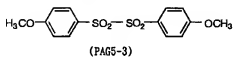
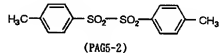
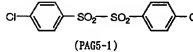
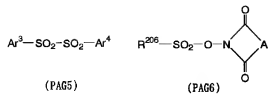


(PAG4-30)

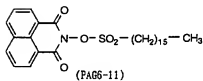
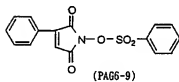
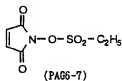
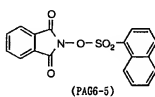
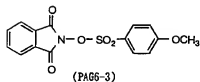
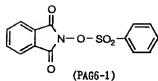


PAG4-37

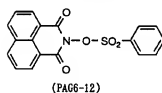
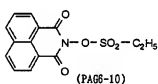
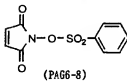
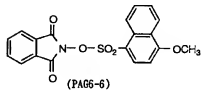
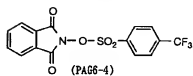
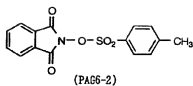




41



42



30

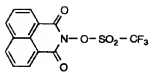
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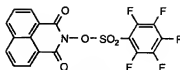
50

43

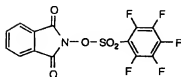


(PAG6-13)

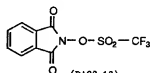
44



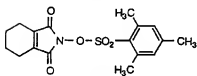
(PAG6-14)



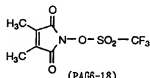
(PAG6-15)



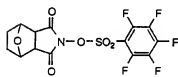
(PAG6-16)



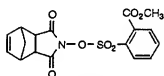
(PAG6-17)



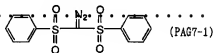
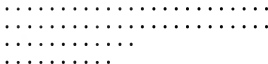
(PAG6-18)



(PAG6-19)



(PAG6-20)

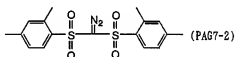


(PAG7-1)

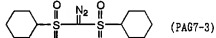


(PAG7)

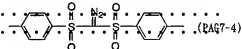
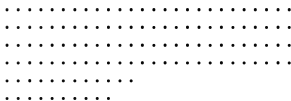
30



(PAG7-2)

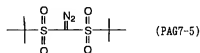


(PAG7-3)

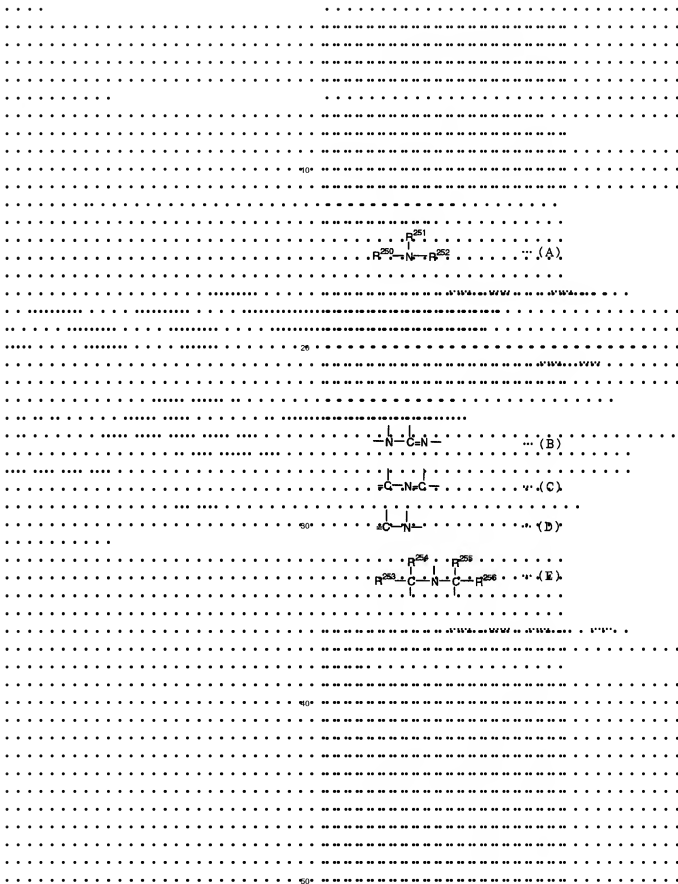


(PAG7-4)

40



(PAG7-5)



[illegible]

110°

120°

150°

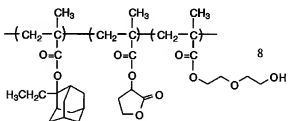
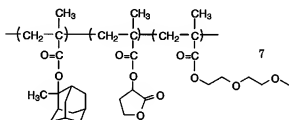
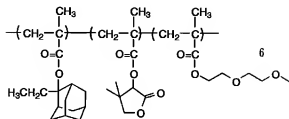
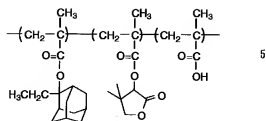
110°

1

2

3

4



54



樹脂	繰り返し単位1 (mol%)	繰り返し単位2 (mol%)	繰り返し単位3 (mol%)	分子量
1-2	40	48	12	10600
1-3	40	44	16	10100
2-1	43	49	8	9500
2-2	41	45	14	9200
3-1	41	51	8	10400
3-2	42	47	11	9600
4-1	40	55	5	11300
4-2	39	53	8	9300
5-1	40	54	6	9700
5-2	41	49	10	9200
5-3	39	46	15	8600
6-1	43	55	2	13400
6-2	43	53	4	13100
7-1	40	58	2	12900
7-2	40	56	4	12300
8-1	44	53	3	11800
8-2	42	54	4	12000
9-1	46	51	3	11000
9-2	49	47	4	11300
9-3	48	47	5	11800
10-1	44	54	2	12200
10-2	45	52	3	11800
11-1	48	49	3	13100
11-2	49	46	5	13400
12-1	50	48	2	11900
12-2	49	47	4	11800
13-1	47	51	2	12100
13-2	48	48	4	12900
14-1	49	48	3	11200
14-2	47	49	4	11400

No.	樹脂	光酸発生剤	アミン	パターンプロ ファイル	現像欠陥 数	データ率の 解像力(μm)
実施例 1	1-1	PAG-1	2	○	60	0.21
実施例 2	1-3	PAG-2	1	○	70	0.21
実施例 3	2-1	PAG-3	1	○	60	0.22
実施例 4	2-2	PAG-1	1	○	80	0.22
実施例 5	3-1	PAG-1	1	○	70	0.21
実施例 6	3-2	PAG-3	2	○	90	0.21
実施例 7	4-1	PAG-1	1	○	80	0.22
実施例 8	4-2	PAG-1	1	○	60	0.22
実施例 9	5-1	PAG-2	1	○	70	0.21
実施例 10	5-2	PAG-1	1	○	90	0.22
実施例 11	5-3	PAG-3	1	○	80	0.21
実施例 12	6-1	PAG-2	1	○	90	0.22
実施例 13	6-2	PAG-2	1	○	80	0.22
実施例 14	7-1	PAG-1	2	○	80	0.22
実施例 15	7-2	PAG-3	1	○	90	0.22
実施例 16	8-1	PAG-2	1	○	80	0.22
実施例 17	8-2	PAG-2	1	○	80	0.22
実施例 18	9-1	PAG-3	1	○	50	0.20
実施例 19	9-2	PAG-2	2	○	50	0.20
実施例 20	9-3	PAG-2	1	○	50	0.20
実施例 21	10-1	PAG-1	1	○	50	0.20
実施例 22	10-2	PAG-2	1	○	50	0.20
実施例 23	11-1	PAG-2	1	○	45	0.20
実施例 24	11-2	PAG-2	1	○	45	0.20
実施例 25	12-1	PAG-3	1	○	45	0.20
実施例 26	12-2	PAG-2	1	○	45	0.20
実施例 27	13-1	PAG-1	1	○	80	0.22
実施例 28	13-2	PAG-3	2	○	90	0.22
実施例 29	14-1	PAG-1	1	○	80	0.22
実施例 30	14-2	PAG-1	1	○	90	0.22
比較例 1	R1	PAG-1	2	×	6000	0.25
比較例 2	R2	PAG-1	2	×	2000	0.24

No.	樹脂	光酸発生剤	W 剤	アミン	パターンアプロフ マイル	現像穴径 μm	エタノール中の 解像力(μm)
実施例 31	1-2	PAG-1	W-1	1	○	50	0.20
実施例 32	1-3	PAG-3	W-2	2	○	50	0.20
実施例 33	2-1	PAG-3	W-3	1	○	45	0.20
実施例 34	2-2	PAG-1	W-4	1	○	75	0.22
実施例 35	3-1	PAG-3	W-1	2	○	50	0.20
実施例 36	3-2	PAG-3	W-2	1	○	60	0.20
実施例 37	4-1	PAG-1	W-3	1	○	50	0.20
実施例 38	4-2	PAG-3	W-4	1	○	60	0.22
実施例 39	5-1	PAG-3	W-2	1	○	55	0.20
実施例 40	5-2	PAG-1	W-3	1	○	60	0.20
実施例 41	5-3	PAG-3	W-1	2	○	50	0.20
実施例 42	6-1	PAG-3	W-2	1	○	50	0.20
実施例 43	6-2	PAG-3	W-3	1	○	45	0.20
実施例 44	7-1	PAG-1	W-4	1	○	75	0.22
実施例 45	7-2	PAG-2	W-1	1	○	55	0.20
実施例 46	8-1	PAG-3	W-2	2	○	50	0.20
実施例 47	8-2	PAG-2	W-3	1	○	50	0.20
実施例 48	9-1	PAG-1	W-1	1	○	30	0.19
実施例 49	9-2	PAG-3	W-2	1	○	30	0.19
実施例 50	9-3	PAG-2	W-4	1	○	30	0.20
実施例 51	10-1	PAG-3	W-1	1	○	30	0.19
実施例 52	10-2	PAG-3	W-2	2	○	30	0.19
実施例 53	11-1	PAG-2	W-3	1	○	25	0.19
実施例 54	11-2	PAG-2	W-4	1	○	35	0.19
実施例 55	12-1	PAG-2	W-1	1	○	25	0.19
実施例 56	12-2	PAG-1	W-4	1	○	35	0.20
実施例 57	13-1	PAG-1	W-2	2	○	55	0.20
実施例 58	13-2	PAG-2	W-3	1	○	50	0.20
実施例 59	14-1	PAG-2	W-1	1	○	55	0.20
実施例 60	14-2	PAG-2	W-1	1	○	50	0.21
比較例 3	R1	PAG-1	W-1	1	×	4000	0.24
比較例 4	R2	PAG-1	W-1	1	×	1800	0.23

[illegible]